Air Force CALS Test Network

Xrastb Users Guide

AFCTN 94-039

AFCTB-ID 94-043
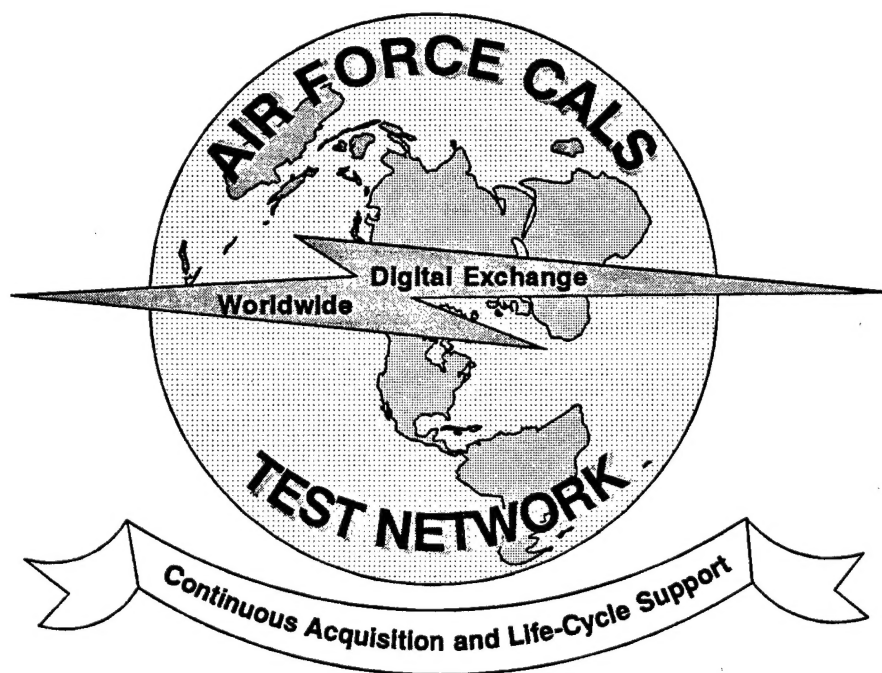
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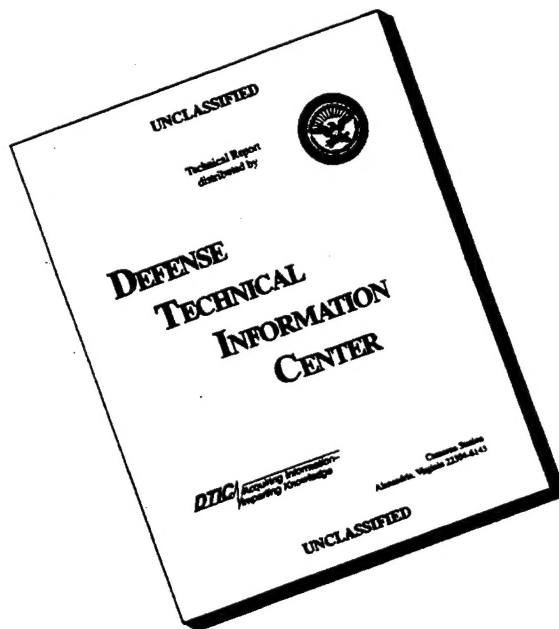
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USER'S GUIDE

Xrastb Version 1.1

12 May 1994

Prepared for:

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USER'S GUIDE
Xrastb Version 1.1

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1. Introduction

The *CALS X-Raster Toolbox*, also known as *Xrastb*, is the standard Air Force CALS Test Network (AFCTN) MIL-R-28002 CALS raster file viewer. *Xrastb* runs under the industry standard X-windows and Motif windowing environments for UNIX, thus allowing you, the user, to view and manipulate CALS raster image files on most popular UNIX platforms.

1.1 *Xrastb* Capabilities and Functions

Xrastb capabilities and functions let you:

- View CALS raster images 1:1 (actual size) with window scrolling

- View entire raster images at once

- Automatically check CALS raster file header data for compliance with MIL-STD-1840A and MIL-R-28002

- View CALS raster file header data

- Edit CALS raster file header fields

- Convert CALS raster images to Sun raster or raw bitmap formats

- Rapidly view CALS raster images through a command line interface (CLI)

With the exception of the CLI rapid viewing capability, all of the basic *Xrastb* functions are available from a single display, referred to herein as the **main menu window**. The main menu window lets you interact with the software functions using either standard mouse point-and-click techniques, or through a keyboard by requiring you to type necessary information into appropriate fields. Some functions may require one type of interaction without recourse to the other; these are explicitly identified herein.

1.2 Obtaining *Xrastb*

The *Xrastb* software is available for use without charge from the Air Force CALS Test Bed (AFCTB), and may be obtained via Internet file transfer, or on media, either 3.5-inch disk (UNIX "tar" compression format) or 1/4-inch streaming tape cartridge. Special handling of software provided on these media is required; see the instructions provided in *Appendix 1: Xrastb Distribution Media Instructions*.

Instructions for obtaining or requesting the software are in the following paragraphs.

1.2.1 Internet

The *Xrastb* software is available via anonymous ftp from the AFCTB Internet server. If you have access to Internet, this is the fastest and most reliable method of acquiring the latest version of *Xrastb*. Step-by-step instructions for acquiring the software by this method and preparing it for use are provided in *Appendix 2: Xrastb Internet Distribution*.

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1.2.2 Telephone Request

You can request the *Xrastb* software, on media as indicated above, directly from the AFCTB administrative office. Telephone requests are accepted by the AFCTB office Monday - Friday during normal business hours, 8 AM - 5 PM EST. The commercial telephone numbers are:

(513) 257-2229 (recorded auto-attendant) ext. 359 or

(513) 257-3085 (receptionist) request ext. 359.

The DSN telephone numbers are:

DSN 787-2229 (recorded auto-attendant) ext. 359 or

DSN 787-3085 (receptionist) request ext. 359.

1.2.3 FAX Request

FAX requests for the software are also accepted by the AFCTB. FAX requests may be sent to:

(513) 257-5881; or

DSN 787-5881.

Mark FAX requests with the legend "ATTN: AFCTB". Ensure that information is provided in FAX requests to permit the AFCTB office to respond correctly, e.g., company or entity name, complete mailing address, contact person and telephone number, and special handling instructions if required.

1.2.4 Mail Request

If you prefer, mail requests for the *Xrastb* software media are also accepted by the AFCTB. The address for mail requests is:

DET 2, HQ ESC/AV-2
4027 Colonel Glenn Highway, Suite 300
Dayton, OH 45431-1672

As with FAX requests, ensure that information is provided to permit the AFCTB office to respond correctly, e.g., company or entity name, complete mailing address, contact person and telephone number, and special handling instructions if required.

2. Procedures

This section answers the question "How do I use this software?". Each subsection details the exact steps required to complete a given function. After you follow the startup instructions below, each subsequent function description assumes that *Xrastb* is running and that the main menu window is displayed.

2.1 Starting *Xrastb*

The uncompressed *Xrastb* software is one executable file. Prior to startup, *Xrastb* accepts certain command line arguments as detailed in section 4 herein. However, for normal operations, start the software from its resident directory at the UNIX prompt by typing **xrastb.[*platform name*]**. For example, on a Sun SPARC system, you would start *Xrastb* by typing **xrastb.sun4**. If *Xrastb* was installed correctly on your system (i.e., per the instructions in either *Appendix 1: Xrastb Distribution Media Instructions*, or *Appendix 2: Xrastb Internet Distribution*), you should see the main menu window as shown in Figure 1 below.
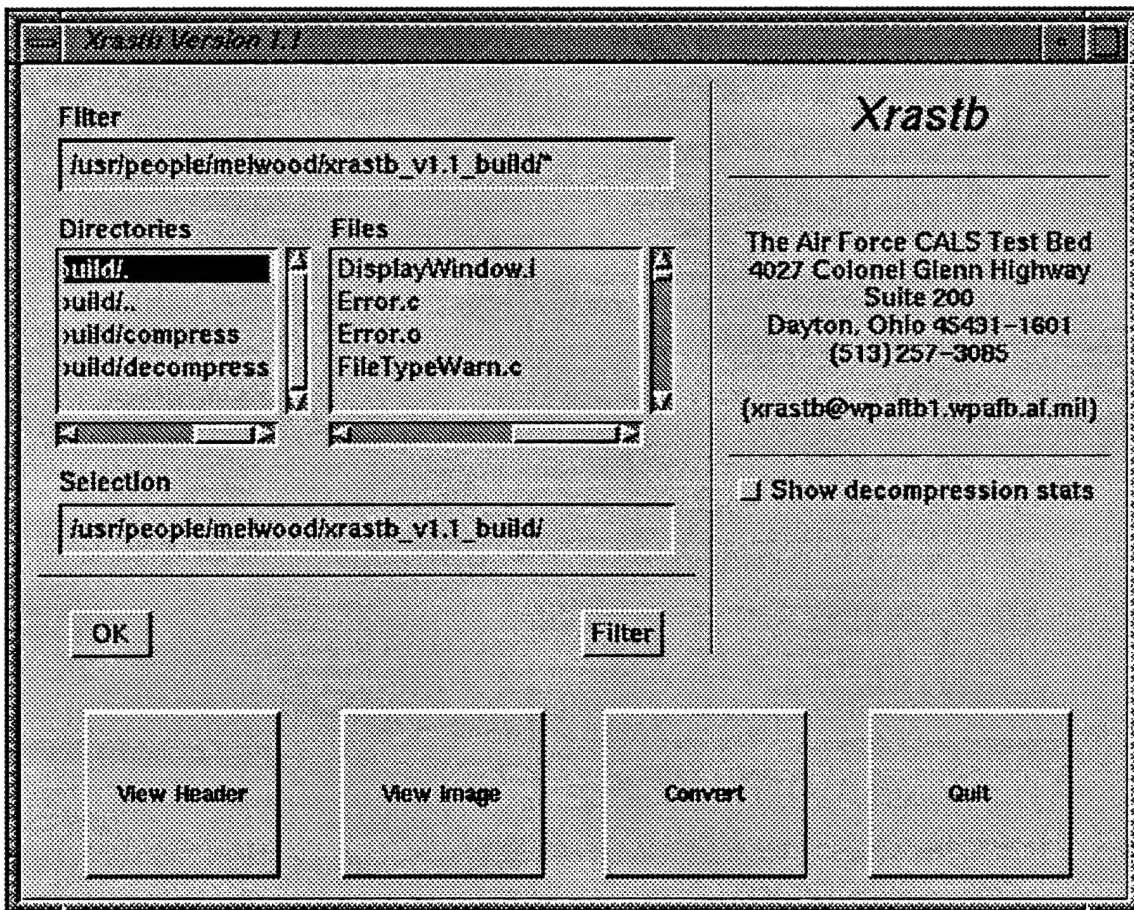

Figure 1: *Xrastb* **Main Menu Window**

All of the basic *Xrastb* functions are available to you from the main menu window. Each field and button has a specific function, as follows:

- The **Filter** text-input field at the upper-left of the main window permits you to specify file-search criteria by typing in a pathname for a specific CALS raster file. The / (slash) character delineates directories, and you can also use * (asterisk) wildcards in the filter field. Initially, this field specifies the directory where the *Xrastb* software resides.

- The **Filter** button at the window's lower center activates the path search changes you make in the Filter field.

- The scrolled **Directories** list, at the left of the main window, displays other directories contained within the current directory. Note that both the /. (current directory) and /.. (preceding directory) are both available for navigation, which may be accomplished using either mouse point-and-click techniques or activating the Filters field.

- The scrolled **Files** list, near the center of the main window, displays the files contained within the current directory. The contents of the Files field are affected by the activated contents of the Filter field. The Files field also provides a means to select a file for *Xrastb* operations using mouse point-and-click techniques.

- The **Selection** text-input field, located beneath the Directories and Files lists, displays the path- and filename of the currently selected file; that is, the file you select for the *Xrastb* software to work with.

- The **OK** button activates changes you make within the Selection field.

- The **View Header** button opens a new window displaying the contents of the selected CALS raster file header. Other user options are also provided within this new window.

- The **View Image** button opens a new window displaying the graphic contents of the selected CALS raster file. Other user options are also provided within this new window.

- The **Convert** button opens a new window which provides functions to convert CALS raster image files to Sun raster or raw bitmap image files. Other user options are also provided within this new window.

- The **Quit** button terminates operation of the *Xrastb* software.

2.2 Selecting and Registering a File

All *Xrastb* functions require that a CALS raster file be *registered*, thereby "telling" *Xrastb* which filename to perform operations upon. Depending upon the your system's response time, a single mouse double-click action may register the file; however, systems with slower response time may require the more conservative approach described below.

In general, you register a filename by first *selecting* the file, then performing a second action on the file to register it. Working within the scrolling fields on the left-hand side of the main menu window, file selection and registration may be completed in either of two ways:

1. Using standard mouse point-and-click techniques in the scrolled **Directories** list, you can "browse" (search) through available directories to find and select (click) a file in the scrolled **Files** list. The complete path/filename of the selected file will appear in the **Selection** field. Once selected/highlighted, you register the file by:

   - Hit the **Enter/Return** key, which causes the on-screen **OK** button to flash; or

   - Double-click the highlighted filename, which causes the on-screen OK button to flash; or

   - Click the on-screen OK button to register the file with the software.

2. Alternatively, you may select a CALS raster file by directly typing the path- and filename into the **Selection** text field (located immediately below the scrolled lists mentioned above), then pressing **Enter/Return** to register the file.

The appearance alone of a selected file's path/filename, whether entered manually or automatically, in the **Selection** field does not constitute file registration. One of the above secondary actions must be completed in order to ensure that the file is registered. Further, the file's complete path/filename must appear in the **Selection** field; the field does not simply work against filenames within the current directory.

If all or part of the directory path to the file (the file's pathname) is known, but the filename is not, the known information may be directly entered into the text field labeled **Filter** at the top of the main menu window in order to limit the file search parameters. If this search method is used, changes in the **Filter** field are implemented by clicking the on-screen **Filter** button. This action updates the information displayed in the scrolled **Directories** and **Files** lists.

If neither the directory name nor the filename is known, the directory tree may be searched using point-and-click techniques on the directory names displayed in the **Directories** list; the current path will be updated and displayed in the **Filter** field.

In order to display all of the contents of the current directory in the **Files** field, the pathname displayed in the **Filter** field may be followed by the * (slash-asterisk) wildcard. You may further limit wildcard searches by using additional search parameters, such as *.cal to display only filenames with a .cal suffix. When the desired filename appears in the **Files** list, you can then use one of the ways described above to select and register the file.

Care should be taken to ensure that the selected filename is, in fact, registered and not simply selected. This is particularly true when registering a filename using the double-click technique described above. If the desired filename is not first selected, or if the selected filename is not registered, an error message or other undesired output will occur.

Herein, the use of the terms *select, file selection, selected file* or *selection process* refer to the complete file section and registration processes described above.

2.3 Working With CALS Raster File Headers

When viewing or working with the header information of CALS raster files, it is vitally important to ensure that the header information continues to meet the MIL-STD-1840A standard and the MIL-R-28002 specification.

2.3.1 Viewing a CALS Raster File Header

To view a CALS raster file header:

1. Select and register a file as described in section 2.1 above;

2. Click once on the **View Header** button, located at the bottom left-hand corner of the main menu window.

A **Header Information** window is displayed. The window contains all of the header information from the selected file. The displayed header information is organized into header fields, as follows:

- *srcdocid:* source document identification

- *dstdocid:* destination document identification

- *txtfilid:* text file identification

- *figid:* figure identification

- *srcgph:* source graphic

- *doccls:* document classification

- *rtype:* raster file type (1 or 2)

- *rorient:* raster file orientation

- *rpelcnt:* raster pixel count (image size)

- *rdensty:* raster file density

- *notes:* free-form user comments

When finished viewing the header, press the **OK** button at the bottom right-hand corner of the **Header Information** window to return *Xrastb* to the main window.

2.3.2 Verifying a CALS Raster File Header

When viewing or working with the header information of CALS raster files, it is vitally important to ensure that the header information continues to meet the MIL-STD-1840A standard and MIL-R-28002 specification. To support this requirement, a header validation function is included in the *Xrastb* software. The information contained in a CALS raster file header may be validated by clicking on the **Header Information** window's **Validate** button.

When the **Validate** button is clicked, the entire header is processed through a complete validation test function; the results are displayed in a new **Raster Validation** window which pops up when validation testing is complete. The **Validate** function checks for correct field names, proper spacing of header data, and appropriate values for the **rorient:**, **rpelcnt:**, and **rtype:** fields.

When finished viewing the **Validate** function results, click on the **Raster Validation** window's **OK** button to return to the **Header Information** window. From the **Header Information** window, the raster file header information may be modified (edited) or the **Header Information** window may be exited.

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2.3.3 Modifying a CALS Raster File Header

Xrastb allows you to modify the CALS raster file header fields. When working with the CALS raster file header information, it is vitally important to ensure that the header information continues to meet the MIL-STD-1840A standard and the MIL-R-28002 specification.

Some guidelines must be followed when editing CALS raster file header fields:

1. *Xrastb* will permit you to edit any header information, including the header field names. Field names are short 5- to 8-character names followed by a colon/space combination (such as **srcdocid:[space]**). If you accidentally modify header field names, the CALS raster file header will likely become corrupt, rendering the file unreadable. Therefore, unless the **Verify** function finds that a specific problem exists with the field names, or unless you are certain what is to be edited and for what purpose, do not edit the header field names.

2. It is generally destructive to edit the **rpelcnt:** field at all, because changing the numbers contained therein could render the file unreadable.

3. Unless a known problem exists, it is generally destructive to edit the **rtype:** , **rorient:** , or **rpelcnt:** fields.

To modify CALS raster file header information:

1. Select the file as described in section 2.1 above;

2. Click the **View Header** button.

3. Toggle the **Editable** button at the bottom left-hand side of the **Header Information** window. This step permits editing of all header information fields.

4. To edit a specific field, click inside the text box containing the field to be edited. A cursor will appear where the mouse was clicked.

5. New text may be entered or existing text may be deleted or replaced as in any windowed text-processing application.

6. When finished editing header information, click on the **Save** button to update the raster file header information. A dialog box will display to inform you of the save operation's status.

To verify that the file was saved correctly, exit from the **Header Information** screen by clicking the **OK** button, then click the **View header** button again from the main window.

You can then choose to validate or further edit the raster file header information. If the raster file is to be validated, you must exit and re-enter the **Header Information** screen to ensure that header information changes are accurately reflected for validation.

2.4 Viewing CALS Raster Images

The principle function of *Xrastb* is to permit viewing of CALS raster images. The viewing function is accomplished through the **View Image** button at the bottom of the main window. To view a CALS raster image:

1. Select a raster file for viewing as described in section 2.1 above.

2. Click on the **View image** button.

3. After the file is loaded into memory, the **Display Image** window appears. Using the standard techniques of your windowing system, the window may be moved or placed anywhere on the system display, and may also be resized.

The **Display Image** window contains several areas of interest:

1. The main part of the **Display Image** window contains the CALS raster file being viewed.

2. At the top of the **Display Image** window are two control buttons. The rightmost button, **View Entire File**, allows you to view the entire image on the display screen. The function is useful for viewing images which are larger than the display screen. The function operates by compressing the entire displayed image to the largest size that can fit completely on the screen, using whatever scaling factor is necessary to achieve this. The **Exit** button returns the software to the main menu window.

3. For your information, the **line** number and pixel (**pel**) number of the mouse pointer's current location within the raster image are also displayed at the top of the **Display Image** window.

2.5 Converting CALS Raster Image Files

Convert is the final main menu window function. As previously, the conversion process begins by selecting a CALS raster file to work with, as described in section 2.1.

Once a CALS raster file is selected, the **Convert** button, located at the bottom of the main menu window, displays a **Conversion Utility** window containing available conversion options.

The topmost field of the **Conversion Utility** window displays the path/filename of your selected input file.

By selecting one of the diamond combinations displayed in the central area of the **Conversion Utility** window, you may choose an output file conversion format for the selected CALS raster file. Currently, if the input file is a CALS raster file, the image may be output to either **Raw Raster** or **Sun Raster** formats by selecting the appropriate diamond button. If the input file is a Sun Raster file, the image may be converted into the CALS raster format. Raw raster is not currently an input option.

You may also specify an output filename in the **Out File Name** field. If you do not enter an output filename, the default filename is the input filename with a **.out** suffix appended. The file conversion is implemented when you select the **OK** button. In the event of errors during the file conversion process, an error message box will appear on the display. After file conversion is complete, or if the conversion operation is canceled, you are returned to the main menu window.

3. *Xrastb* Messages

This section describes the various error, warning and information messages that may be encountered while using *Xrastb*. All messages are listed, along with descriptions of circumstances where the messages may be encountered and their meaning.

3.1 Error Messages

MESSAGE: *Can't read the raster file*

OCCURS DURING: **View Header, View Image, or Convert**

MEANING: The CALS raster file does not exist in the specified path, or the user does not have permission to read the file. If the user entered the filename in the **Selection** field of the main menu window, ensure that the path/filename is correct. If the filename was selected using the point-and-click techniques and procedures described in section 2.1 above, ensure that the filename is also registered with the software.

MESSAGE: *The rpelct: / rorient: field in the header contains incorrect data*

OCCURS DURING: **View Image**

MEANING: The CALS raster file header has invalid information in the area where the image size (**rpelcnt**) or orientation (**rorient**) should be. The file may not be a CALS raster file, or may be corrupt. Check the header with the **View Header** function.

MESSAGE: *The rtype is not 1 or 2*

OCCURS DURING: **View Image**

MEANING: The CALS raster file image type (**rtype**) field in the CALS raster file header does not have a value of 1 or 2. The value may be corrected with the modify header function (See paragraph 2.2.3)

MESSAGE: *This program can't display type 2 raster*

OCCURS DURING: **View Image**

MEANING: The raster file was encoded as CALS raster type 2, which the decompression algorithm does not currently support.

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MESSAGE: *The rpelcnt field in the header contains a 0 value*

OCCURS DURING: **View Image**

MEANING: The pixel count (**rpelcnt**) field in the CALS raster header has a zero value. The file may be a "dummy" file which contains no data.

MESSAGE: *Invalid 2d code word*
         Invalid H run length

OCCURS DURING: **View Image**

MEANING: The CALS raster file contains an invalid binary sequence; the decompression software is unable to read the file data. By clicking the available **View Anyway** button, the user can see the portion of the file which was valid until the error occurred.

MESSAGE: *An error occurred while opening/ writing to the raster file*

OCCURS DURING: **Save New Header**

MEANING: *Xrastb* can't write the new header to the existing raster file. The user running *Xrastb* may not have appropriate permissions to the raster file.

3.2 Warning Messages

MESSAGE: *The file does not seem to be a CALS raster file*

OCCURS DURING: **View Header**

MEANING: *Xrastb* doesn't see **srcdocid:** as the first part of the raster file header. The file may not be a CALS raster file, or could have a corrupt header. The user may choose to view the header, or cancel the function and return to the main window.

3.3 Informational Messages

MESSAGE: *Updated [filename] header*

OCCURS DURING: **Save New Header**

MEANING: *Xrastb* successfully rewrote the CALS header to the raster file.

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4 *Xrastb* Command Line Functions

For your convenience, the *Xrastb* software provides a limited set of command line functions. You may choose to implement these functions depending upon your circumstances.

4.1 *Xrastb* Command Line Operation

To facilitate rapid viewing of CALS raster files, the *Xrastb* software has a command line interface (CLI) option which allows you to bypass the main menu window and directly view a CALS raster image.

To activate the CLI option, you must execute *Xrastb* with a valid path/filename added to the command line, or with only a filename if *Xrastb* is executed from a directory containing the target CALS raster file. *Xrastb* will display either an error message window, or will place the image within a **View Image** window on the display. When you click on the **Exit** button from the **View Image** window, *Xrastb* will exit the application and return the system to its previous environment. Thus, you never see the main menu window.

4.2 Small Memory Option

The *Xrastb* software uses a large amount of memory to display and manipulate images. This may cause performance problems while executing on workstations with lesser memory. The *Xrastb* software includes a small-memory option which permits platforms with lesser memory to use approximately half of the memory normally required to display CALS raster images. However, the use of lesser memory is performed at the expense of smooth display scrolling, and it also causes the **View Entire File** function to double in time required to execute. If needed, the *Xrastb* small memory option is invoked with a -s command line option; e.g. **xrastb.[platform name] -s**.

Appendix 1:

Xrastb Distribution Media Instructions

A1.1 UNIX "tar" Disk

If you received the *Xrastb* software on a 3.5-inch disk containing the software in the UNIX "tar" compression format, use the following procedure to extract the contents of the disk:

1. Ensure that you have write permission in the directory in which the procedure is run.

2. Create an *Xrastb* subdirectory below the current directory:
   mkdir xrastb

3. Change directories into the *Xrastb* subdirectory:
   cd xrastb

4. Decompress the "tar" files:
   tar -xvf /dev/rfd0

5. The decompressed files are automatically placed into the current *Xrastb* directory.

6. Eject the disk:
   eject fd

The example below demonstrates the procedure used to extract *Xrastb* on a Sun SPARC with an internal 3.5-inch disk drive. The commands are standard across most UNIX platforms; however, the device name may differ, depending upon your particular hardware. If necessary, replace the command portion .../**dev/rfd0** below with the device name of your system's 3.5-inch disk drive to run this procedure.

```
sparc2% mkdir xrastb
sparc2% cd xrastb
sparc2% tar -xvf /dev/rfd0
x xrastb.sun4, 917504 bytes, 1792 tape blocks
sparc2% eject fd
sparc2%
```

A1.2 1/4" Streaming Tape

If you received *Xrastb* on a 1/4" streaming tape cartridge, use the following procedure to extract the contents of the tape:

1. Ensure that you have write permission in the directory in which the procedure is run.

2. Create an *Xrastb* subdirectory below the current directory:
   mkdir xrastb

3. Change directories into the *Xrastb* subdirectory:
   cd xrastb

4. Decompress the "tar" files:
   tar -xvf /dev/rst0

5. The decompressed files are placed into the current *Xrastb* directory.

The following example demonstrates the procedure used to extract *Xrastb* on a Sun SPARC with an external SCSI 1/4" streaming tape drive. The commands are standard across most UNIX platforms; however, the device name may differ, depending upon your particular hardware. Consult your hardware manuals for the correct device names and, if necessary, replace the command portion .../**dev/rst0** with the device name of your system's tape drive to run this procedure.

```
sparc2% mkdir xrastb
sparc2% cd xrastb
sparc2% tar -xvf /dev/rst0
x xrastb.sun4, 917504 bytes, 1792 tape blocks
sparc2%
```

Xrastb Internet Distribution

A2.1 Obtaining *Xrastb* From Internet

If you have access to Internet, the *Xrastb* software is available at no cost via anonymous ftp from the AFCTB Internet server. To obtain *Xrastb* via Internet:

1. ftp to the AFCTB Internet server using the Internet Protocol (IP) address, as follows:
   ftp 137.245.100.18

2. If a login prompt is displayed after the connection, proceed to step 3. If no login prompt is displayed after the connection is established, type:
   user [Return]

3. At the "login:" or "Name:" prompt, type:
   anonymous [Return]

4. At the "password" prompt, enter:
   [your e-mail address] **[Return]**

5. You will receive a short message introducing the AFCTB server. At the *ftp>* prompt, after the intro message completes, change the current directory by typing:
   cd /ctntools/raster/xrastb [Return]

6. Depending upon the ftp software your platform uses, you may receive an extensive message describing files available on the AFCTB server. This message is contained in a **.message** text file in this directory. If displayed, **READ THIS MESSAGE**, as it includes current *Xrastb* version and platform information. If the message is not displayed, type:
   dir or ls
   to list the contents of the current directory to determine which *Xrastb* platform version you should get.

7. Change the transfer mode to binary by typing:
   type binary [Return]

8. Download the *Xrastb* compressed executable program to your system by typing:
   get xrastb.*[platform name]*.Z [Return],
   replacing *[platform name]* with the Xrastb version required for your particular hardware platform.

9. When the compressed executable program is on your system, uncompress the file by typing:

uncompress xrastb.*[platform name]*.Z [Return]

replacing *[platform name]* with the Xrastb version required for your particular hardware platform.

A2.2 Example *Xrastb* Internet Download

As an example, if you have a SPARCstation (designated below as system name "sparc1"), you can download *Xrastb* using the commands indicated below in boldface. Typical system responses are in regular type.

```
sparc1% ftp 137.245.100.18
ftp 137.245.100.18
220 wpaftb1 FTP server (Version 2.1aWU(11) Thu Dec 23 08:27:28 EST 1993) ready.
user
Username: anonymous
331 Guest login ok, send your complete e-mail address as password.
[your e-mail address]
230-Welcome to the Air Force CALS Test Bed Internet Node!
230-11 Feb 1994 - 0830 EST -
230-
230-We encourage new users to send a short em to the AFCTB let us know who
230-you are and why you are using the system.  This will help us better meet
230-your needs.  This file is ".message"
230-
230-If we can help in any way, also let us know.  The em address is
230-gelwood@wpaftb1.wpafb.af.mil
230-
230-***** FILES AVAILABLE *****
230-
```

> NOTE: the login sequence provides a lengthy informational ".message", not reproduced here, explaining data available on the AFCTB Internet server.

```
230-
230 Guest login ok, access restrictions apply.
ftp> type binary
200 Type set to I.
ftp> cd ctntools/raster/xrastb
250-***********************************************
250-  XRASTB Version 1.1
250-***********************************************
250-  Xrastb is an X-windows based CALS raster image viewer.  It allows
250-the user to view both the data and the header and modify the header.
250-It also allows the user to convert back and forth between CALS raster
250-and Sun raster files.
250-
250-      xrastb.hp700.Z      - HP 9000/700 (HP/UX 9.0) binary for Xrastb 1.1
250-      xrastb.ingr.Z       - Intergraph 6000 (X11R5) binary for Xrastb 1.1
250-                              NOTE: You must own the MGUI product.
250-         xrastb.sgi.Z        - Silicon Graphics binary for Xrastb 1.1
250-      xrastb.sun4.Z       - Sun SPARCstation binary for Xrastb 1.1
250-                              NOTE: You must own Motif.
250-                              e-mail to melwood@wpaftb1.wpafb.af.mil for
250-
250-      proto.cals.hdr      - sample "protoheader" required for
250-                              Sun raster->CALS raster conversion.
```

```
250-                                    The header data is read from this file.
250-                                    This file can be edited with the "View
250-                                    Header" function in Xrastb just like any
250-                                    other raster header.
250-
250-
250 CWD command successful.
ftp> get xrastb.sun4.Z
200- PORT command successful.
150- Opening BINARY mode data connection for xrastb.sun4.Z (523379 bytes).
226- Transfer complete.
523379 bytes received.
ftp> quit
Goodbye
```

A2.3 Uncompressing the *Xrastb* Software

To speed transfer time, *Xrastb* is compressed on the AFCTB Internet server. Before
Xrastb can be run, it must be decompressed. The following command will decompress the
version of *Xrastb* downloaded in the above example:

```
sparc2% uncompress xrastb.sun4.Z
```

Appendix 3:

APPLICATION NOTICE: Sun SPARC Platform

When operating the *Xrastb* software on a Sun SPARC platform under OpenWindows, certain keys (such as the backspace key) will not work correctly; error messages will be displayed in the terminal window. The lines below must be added to the file **/usr/openwin/lib/XKeysymDB** to correct this problem. If OpenWindows' **/lib/XKeysymDB** file is installed in another directory, replace the **/usr/openwin** pathname portion above with the appropriate pathname. These lines are also provided on the enclosed disk/tape in the file **Motif.keys**.

```
osfBackSpace                    :1004FF08
osfInsert                       :1004FF63
osfDelete                       :1004FFFF
osfCopy                         :1004FF02
osfCut                          :1004FF03
osfPaste                        :1004FF04

osfAddMode                      :1004FF31
osfPrimaryPaste                 :1004FF32
osfQuickPaste                   :1004FF33

osfPageUp                       :1004FF41
osfPageDown                     :1004FF42

osfEndLine                      :1004FF57
osfBeginLine                    :1004FF58

osfActivate                     :1004FF44

osfMenuBar                      :1004FF45

osfClear                        :1004FF0B
osfCancel                       :1004FF69
osfHelp                         :1004FF6A
osfMenu                         :1004FF67
osfSelect                       :1004FF60
osfUndo                         :1004FF65

osfLeft                         :1004FF51
osfUp                           :1004FF52
osfRight                        :1004FF53
osfDown                         :1004FF54
```